## REMARKS

Entry of this Amendment is proper under 37 C.F.R. § 1.116 because the Amendment places the application in condition for allowance for the reasons discussed herein; and does not raise any new issues requiring further search and/or consideration. Entry of the Amendment is thus respectfully requested.

Claims 1-33 are currently pending. Claims 8, 9, 15-27, 32, and 33 stand withdrawn as directed to non-elected subject matter.

Claims 1, 5, 7, 10, 11, 13, 28, 29, and 31 have been amended. Support for these amendments may be found throughout the specification and claims as-filed, especially at page 7, lines 19-25, page 16, lines 5-6, and Examples 4, 5, and 12. No new matter has been added.

### Claim Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 1-7, 10-14 and 28-31 stand rejected under 35 U.S.C. § 112, first paragraph, because the specification, while enabling for a vector encoding the *Arabidopsis* MinD protein, plants and cells transformed with it and a method of using it to produce a plant with one or few chloroplasts, purportedly fails to provide enablement for vectors comprising a gene encoding a protein with the same functional activity as the *Arabidopsis* MinD protein, plants and cells transformed with them and a method of using them to produce a plant with one or few chloroplasts.

The specification purportedly fails to disclose genes that encode proteins with the same functional activity as the *Arabidopsis* MinD gene and purportedly fails to teach derivates of the *Arabidopsis* MinD gene. Further, because the MinD database was created on October 7, 2002, which is after the February 8, 2002 filing date of the

instant application, sufficient information was purportedly not available to one of skill in the art at the time of filing. Applicants respectfully traverse.

Applicants submit that genes that encode proteins with the same functional activity as the *Arabidopsis* MinD gene are taught by the present specification. The present specification teaches homologous genes and methods of their identification throughout the specification, at least at page 7-8, lines 26-10, and page 8-9, lines 19-10. Further, claim 1 states that the gene "encodes a protein which has the same functional activity as a protein encoded by the *Arabidopsis* thaliana MinE or MinD gene...". The specification clearly defines functional activity as "results in the production of fewer and larger chloroplasts in the plant", page 13, lines 17-20. Guidance for determining whether the protein results in the production of fewer and larger chloroplasts in the plant is provided in the specification at least at page 14, lines 10-17, and page 15, lines 1-3.

Additionally, although the MinD database was created on October 7, 2002, sufficient information was available to one of skill in the art at the time of filing for the identification of proteins with the same functional activity as the *Arabidopsis thaliana* MinD gene. A number of sequences in the MinD database were available prior to the filing date of the application. This is illustrated by Figure 1, which represents an alignment of several MinD homologs. This alignment of MinD proteins identifies which MinD amino acid residues are conserved between species, and which MinD amino acid residues are not conserved between species. At the time of filing, one of skill in the art routinely compared amino acid sequences to identify conserved amino acids. To this end, the MinD database is a collection of such analyses which are routinely conducted by one of skill in the art.

Given the teachings regarding the gene and function of analogs and variants, the specification provides enablement for vectors comprising a gene encoding a protein with the same functional activity as the *Arabidopsis* MinD protein, plants and cells transformed with them and a method of using them to produce a plant with one or few chloroplasts. Accordingly, the specification enables any person skilled in the art to make and/or use the invention commensurate in scope with the claims. Applicants respectfully request that the rejection be withdrawn.

**Claim Rejections Under 35 U.S.C. §, Second Paragraph**

Claims 1-7, 10-14 and 28-31 stand rejected under 35 U.S.C. § 112, second paragraph, as purportedly indefinite, for the recitation of "exogenous". It is purportedly not clear as to what gene is exogenous.

In order to expedite prosecution in the subject application and without acquiescing to the Examiner's rejection, claims 1, 10, and 28 have been amended to include the language "and wherein the exogenous gene does not cross-hybridize with a homologous gene of the plant cell". This amendment is supported in the specification at least at page 16, lines 5-6, and Examples 4, 5, and 12. In view of the clarifying amendments, applicants respectfully request that the rejection be withdrawn.

Claims 1, 10 and 28 stand rejected for the recitation of "a protein with the same functional activity as a protein encoded by the *Arabidopsis thaliana* ... *MinD* gene". It is purportedly unclear which protein encoded by the *MinD* gene is being referred to. Additionally, it is purportedly not clear what the exact function of the *Arabidopsis* MinD protein is. Applicants respectfully traverse.

Applicants submit that the function of the MinD protein is clearly described in the specification, at least at page 13, lines 18-21, as "result[ing] in the production of fewer and larger chloroplasts in the plant". One of skill in the art would recognize that any protein encoded by the MinD gene that resulted in the production of fewer and larger chloroplasts in the plant would be encompassed by the claims. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claims 7, 13 and 31 are purportedly indefinite in their recitation of "gene is derived from *Arabidopsis thaliana MinD gene*". It is purportedly unclear how the gene differs from the *Arabidopsis* gene. Claims 5, 11 and 29 are indefinite in their recitation of "derived from a gene of *Arabidopsis thaliana*". It is purportedly unclear how the gene differs from the *Arabidopsis* gene. In order to expedite prosecution in the subject application and not acquiesce to the Examiner's rejection, claims 5, 7, 11, 13, 29, and 31 have been amended to replace the language "derived from" with "or has a significant amount of homology to". Accordingly, Applicants respectfully request that this rejection be withdrawn.

**Claims Rejections Under 35 U.S.C. § 102**

Claims 1-7, 10-13 and 28-31 stand rejected under 35 U.S.C. §102(a) as purportedly being anticipated by Colletti *et al.* (2000, *Curr. Biol.* 10:507-516).

Colletti *et al.* purportedly disclose vectors comprising the *Arabidopsis MinD* coding sequence in the sense or antisense orientation under control of the 35S promoter and *Arabidopsis* plants whose nuclear genome is transformed with the gene; these plants had large chloroplasts that were reduced in number. Seeds of transformed plants were purportedly generated in the production of T1-T3 progeny.

The *Arabidopsis MinD* coding sequence would purportedly be exogenous to the rest of the vector sequence. Furthermore, Colletti *et* al. purportedly discloses vectors, plants and methods that inherently disclose a system of increased efficiency. Applicants traverse.

The present independent claim 1 relates to a vector comprising an exogenous gene which encodes a protein which has the same functional activity as a protein encoded by the *Arabidopsis thaliana MinE* or *MinD* gene. When expressed in a plant cell, this exogenous gene enhances the efficacy of chloroplast transformation, and does not cross-hybridize with a homologous gene of the plant cell. Independent claim 10 relates to plants using the above vector, and independent claim 28 relates to methods of using the above vector.

Although Colletti *et al.* describes vectors comprising an *Arabidopsis thaliana MinD* gene, these vectors are expressed in an *Arabidopsis* plant cell, and would cross-hybridize with a homologous gene of the plant cell. Colletti *et al.* does not describe the claim limitation that the gene is an exogenous gene, nor does Colletti describe that the exogenous gene does not cross-hybridize with a homologous gene of the plant cell.

Further, the vectors, plants, and methods disclosed by Colletti do not inherently disclose a system of increased efficiency. According to MPEP § 2112, the fact that a certain result of characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would

be so recognized by persons of ordinary skill in the art..." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-1951 (Fed. Dir. 1999).

As stated above, Colletti *et al.* does not describe the claim limitation that the gene is an exogenous gene, nor does Colletti describe that the exogenous gene does not cross-hybridize with a homologous gene of the plant cell. In the absence of these limitations, the vectors, plants, and methods disclosed by Colletti do not inherently disclose a system of increased efficiency.

As described in the present specification at least at Example 12 in which the *Arabidopsis MinE* gene was transformed into both tobacco and *Arabidopsis*, the claim limitations related to the exogenous genes are necessary to prevent gene silencing. Colletti *et al.* do not recite all of the elements of the claimed invention, as this reference fails to recite the system of increased efficiency and methods of achieving same. Thus, the claims are not anticipated by Colletti *et al.*

Claims 1-7, 10-13 and 28-31 stand rejected under 35 U.S.C. §102(a) as purportedly being anticipated by Kanamaru *et al.* (2000, *Plant Cell Physiol.* 41:1119-1128 and GenBank Accession No. AB030278, December 2000).

Kanamaru *et al.* purportedly disclose a vector comprising the *Arabidopsis MinD* gene under control of the 35S promoter and *Arabidopsis* plants whose nuclear genome is transformed with the gene; these plants had large chloroplasts that were reduced in number.

Kanamaru *et al.* does not describe the claim limitation that the gene is an exogenous gene, nor does Kanamaru describe that the exogenous gene does not cross-hybridize with a homologous gene of the plant cell.

Further, the vectors, plants, and methods disclosed by Kanamaru do not inherently disclose a system of increased efficiency. As stated above, Kanamaru *et al.* does not describe the claim limitation that the gene is an exogenous gene, nor does Kanamaru describe that the exogenous gene does not cross-hybridize with a homologous gene of the plant cell. In the absence of these limitations, the vectors, plants, and methods disclosed by Kanamaru do not inherently disclose a system of increased efficiency.

According to MPEP § 2112, the fact that a certain result of characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill in the art..." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-1951 (Fed. Dir. 1999).

As described in the present specification at least at Example 12 in which the *Arabidopsis MinE* gene was transformed into both tobacco and *Arabidopsis*, the claim limitations related to the exogenous genes are necessary to prevent gene silencing. Kanamaru *et al.* do not recite all of the elements of the claimed invention, as this reference fails to recite the system of increased efficiency and methods of achieving same. Thus, the claims are not anticipated by Kanamaru *et al.*

Claims 1-2 and 5-7 remain rejected under 35 U.S.C. § 102(b) as being anticipated by Huang *et al.* (1996, *J. Bacteriol.* 178:5080-5085).

Huang *et al.* purportedly disclose expression vectors encoding a bacterial MinD protein and yeast cells comprising the vector, as the bacterial protein would have the same function as the *Arabidopsis* MinD protein. Applicants traverse.

Huang *et al.* does not describe the claim limitation that the gene is an exogenous gene, nor does Huang describe that the exogenous gene does not cross-hybridize with a homologous gene of the plant cell.

Further, the vectors, and methods disclosed by Huang do not inherently disclose a system of increased efficiency. As stated above, Huang *et al.* does not describe the claim limitation that the gene is an exogenous gene, nor does Huang describe that the exogenous gene does not cross-hybridize with a homologous gene of the plant cell. In the absence of these limitations, the vectors, and methods disclosed by Huang do not inherently disclose a system of increased efficiency.

According to MPEP § 2112, the fact that a certain result of characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill in the art..." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-1951 (Fed. Dir. 1999).

As described in the present specification at least at Example 12 in which the *Arabidopsis MinE* gene was transformed into both tobacco and *Arabidopsis*, the claim limitations related to the exogenous genes are necessary to prevent gene silencing. Huang *et al.* do not recite all of the elements of the claimed invention, as

this reference fails to recite the system of increased efficiency and methods of achieving same. Thus, the claims are not anticipated by Huang *et al.*

## CONCLUSION

It is respectfully submitted that all rejections have been overcome by the above amendments. Thus, a Notice of Allowance is respectfully requested.

In the event that there are any questions relating to this amendment or the application in general, it would be appreciated if the Examiner would contact the undersigned attorney by telephone at (703) 836-6620 so that prosecution of the application may be expedited.

Respectfully submitted,

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